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Soil  
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Montana  
Agricultural  
Experiment  
Station  
  
Bozeman,  
Montana

# MONTANA WATER SUPPLY OUTLOOK

Snowpack and Streamflow  
Forecasts as of  
April 1, 1982

UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
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## STATEWIDE OUTLOOK

### Snowfall above average

Snowfall during March was above average over most of Montana, but three areas still show below average snowpack. Recent storms, lack of melt at low elevations, and generally average or above average snow in the higher elevations have virtually assured a good water supply for all of Montana this spring and summer.

The Snowy Mountains near Lewistown, the northeastern portion of the Beartooth Mountains and the northern part of the Bighorn Mountains still have below average amounts of water stored in the snowpack, but the rest of the state has average or above average mountain snowpack.

Areas having above average snow conditions are the Yellowstone, Madison and Gallatin River headwaters in and near Yellowstone National Park, headwaters of the Big Hole, Bitterroot, Upper Clark Fork and Blackfoot Rivers and along the Continental Divide from Butte to Glacier National Park.

### Adequate water supplies expected

Good March snowfall and heavy snows in early April have assured nearly all of Montana an adequate water supply for this spring and summer. Some smaller drainages in central Montana and the lower Yellowstone River drainage are expected to have runoff a little below average.

Drainages that parallel the Continental Divide from the Big Hole River headwaters to the Marias River headwaters are generally expected to have runoff that is 10 to 30 percent above average.

All other areas are forecast to have near to a little above average streamflow.

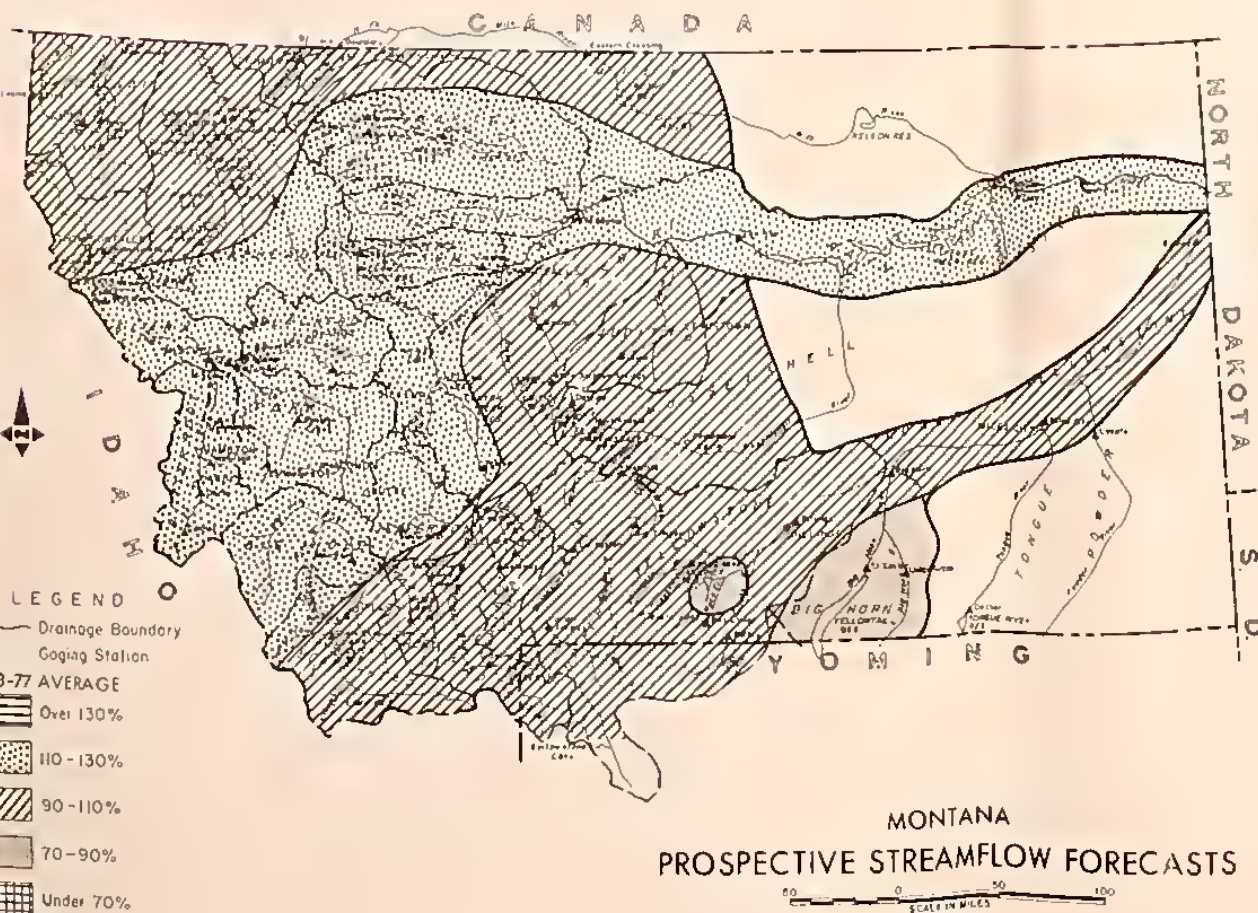
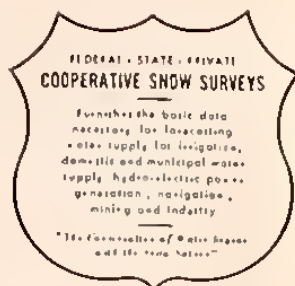
Good high elevation snowpack is expected to hold streamflow up well into the summer.

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The MONTANA WATER SUPPLY OUTLOOK is a publication of the U.S. SOIL CONSERVATION SERVICE. The SCS administers the COOPERATIVE SNOW SURVEY PROGRAM in cooperation with other federal, state, and private agencies, organizations, and individuals.

The report is prepared by SCS, SNOW SURVEY AND WATER SUPPLY FORECAST UNIT, P. O. Box 98, BOZEMAN, MONTANA.

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Many of the pioneering efforts to develop reliable and practical oversnow machines occurred in Montana. The machine pictured was designed and built at Montana State University Agricultural Engineering Department and was used on snow surveys for many years.





# Missouri River & Hudson Bay Drainages

## STREAMFLOW FORECASTS

BASIN STREAM MILE FORECAST POINT	THIS YEAR				PAST RECORD			
	FORECAST		PAST RECORD		FORECAST		PAST RECORD	
	THOUSANDS OF CUBIC FEET	PERCENT OF AVERAGE	THOUSANDS OF CUBIC FEET	PERCENT OF AVERAGE	THOUSANDS OF CUBIC FEET	PERCENT OF AVERAGE	THOUSANDS OF CUBIC FEET	PERCENT OF AVERAGE
PERIOD	APRIL - SEPTEMBER				APRIL - JULY			
REO ROCK RIVER near Monida (1)	111	101	88.4	110	105	102	89.2	103
BEAVERHEAD RIVER near Grant (2)	183	107	133	171	160	108	131	148
BEAVERHEAD RIVER at Barratts (2)	230	102		226	202	103		196
RUBY RIVER near Alder	105	100		105	89.5	101		89.0
BIG HOLE RIVER near Melrose	970	122		792	900	123		730
BOULDER RIVER near Boulder	114	111		103	108	112		96.7
WILLOW CREEK near Harrison	22.7	106		21.5	20.5	107		19.2
MADISON RIVER near Grayling (3)	525	100	405	523	445	101	320	409
MADISON RIVER near McAllister (4)	922	103	716	892	743	105	602	706
GALLATIN RIVER near Gateway	607	106		572	526	108		488
INFLOW HIDDLE CREEK RESERVOIR near Bozeman (5)	30.9	102		30.3	26.9	103		26.2
HYALITE CREEK near Bozeman (6)	47.9	101		47.4	41.7	102		41.0
GALLATIN RIVER at Logan	660	102		649	576	103		557
MISSOURI RIVER at Toston (7)	3010	113	2817	2,671	2606	112	2619	2,330
SHEEP CREEK near White Sulphur Springs	20.5	90		22.8	17.8	90		19.8
SUN RIVER at Gibson Dam (8)	658	113	498	580	604	114	457	529
BELT CREEK near Monarch	132	90		146	121	90		134
MISSOURI RIVER at Fort Benton (9)	4830	116		4,148	4210	116		3,640
TWO MEDICINE CREEK near Browning (10)	285	110		259	268	110		244
BADGER CREEK near Browning	146	110		139	128	110		116
MARIAS RIVER near Shelby	655	114	432	577	615	116	408	532
MISSOURI RIVER at Virgelle (11)	5640	118		4,793	5000	118		4,238
MISSOURI RIVER near Landusky (11)	6300	121		5,214	5500	120		4,586
NORTH FORK MUSSELSHELL RIVER near Delpine	6.4	100		6.4	5.5	100		5.5
SOUTH FORK MUSSELSHELL RIVER above Martinsdale	55.5	90		61.5	52.5	91		57.6
MISSOURI RIVER below Fort Peck Dam (11)	6000	122		4,929	5340	122		4,381
MILK RIVER at Eastern Crossing	258	103		250				
MILK RIVER at Eastern Crossing (12)	90.8	109		83.0				
INFLOW LAKE SAKAWA, ND (11)	14800	110		13,450	13460	110		12,239
SASKATCHEWAN RIVER BASIN								
SWIFTCURRENT CREEK at Sherburne (13)	140	106	121	132	123	107	109	115
ST. MARY'S RIVER near Babb (13)	530	106		498	450	106		426



## WATER SUPPLY OUTLOOK

STREAM or AREA	Flow Prognosis	
	Spring Season	Late Season
Beaverhead	Avg	Avg
Ruby	Avg	Avg
Big Hole	Exc	Exc
Boulder	Exc	Exc
Jefferson	Exc	Exc
Madison	Avg	Avg
Gallatin	Avg	Avg
West-Side Missouri	Exc	Exc
Smith-Belt	Avg	Avg
Sun	Exc	Exc
Teton	Exc	Exc
Marias	Exc	Exc
Judith	Avg	Fair
Musselshell	Avg	Avg
Milk	Avg	Avg
Bear Paws	Avg	Avg
St. Mary's	Exc	Exc

ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE



## Above average run-off forecast

Snowfall in early April along with good March snowfall has assured most water users of an average or above average water supply. Almost all streams having headwaters along the Continental Divide from the Big Hole River northward to the Marias River are expected to have above average runoff this spring and summer. The streams in central Montana are forecast a little below average, but if present storm

patterns continue, these areas may have near average snow cover before melt begins.

Many forecasts increased 10 to 15 percent over those issued a month ago. The above average lower elevation snowpack will provide considerable runoff early in the season and the good high elevation snow will hold streamflows up well into the summer.



Special tests on the accuracy of snow measurements are being conducted in California, Montana, British Columbia, and Ontario.

## Above average snowfall recorded on Missouri

Snowfall during March was above average, and almost all drainages show an increase in snow cover percentages over last month. The greatest increase in snowpack occurred along the Continental Divide from Butte northward to the Glacier Park area.

Presently, all drainages have near or above average amounts of water stored in the snowpack. Low elevation snow courses generally show a higher percentage snowpack than do the higher elevation sites. This is due to good snowfall and very little melt during March at elevations above the foothills.

Valley soils generally have good moisture due to recent precipitation and snowmelt, while mountain soils under the snowpack have near to a little below average moisture.

## SUMMARY OF SNOW MEASUREMENTS

RIVER BASIN or SUBWATERSHED	Number of Courses Averaged	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	Average
Beaverhead	22	158	112
Ruby	12	149	108
Big Hole	20	170	118
Boulder	14	140	120
Jefferson	68	157	115
Madison	27	182	114
Gallatin	20	161	102
Missouri Headwater	115	164	112
West-side Missouri (Toston-Cascade)	9	132	114
Smith	8	131	101
Belt-Arrow	3	147	97
Missouri Main-stem	20	133	105
Teton & Sun	10	286	122
Marias	4	213	119
Marias-Teton-Sun	14	251	121
Judith	11	142	97
Musselshell	14	147	101
Judith-Musselshell	25	145	99
Milk	7	271	108
Bear Paws	6	307	88
Missouri (Total)	174	163	110

Saskatchewan		
St. Mary's	3	154 111
Bow River in Alberta	15	105 99

# Yellowstone River Drainage

## STREAMFLOW FORECASTS

BASIN STREAM MILE FORECAST POINT	THIS YEAR				PAST RECORD			
	FORECAST		PAST RECORD		FORECAST		PAST RECORD	
	THOUSANDS OF CUBIC FEET	PERCENT OF AVERAGE	THOUSANDS OF CUBIC FEET	PERCENT OF AVERAGE	THOUSANDS OF CUBIC FEET	PERCENT OF AVERAGE	THOUSANDS OF CUBIC FEET	PERCENT OF AVERAGE
PERIOD	APRIL - SEPTEMBER				APRIL - JULY			
YELLOWSTONE RIVER at Corwin Springs	2210	105	1703	2,102	1860	106	1466	1,749
YELLOWSTONE RIVER near Livingston	2560	104		2,471	2120	104		2,048
BOULDER RIVER at Big Timber	408	98		416	373	98		382
STILLWATER near Absarokee (1)	625	95		660	520	94		555
CLARK'S FORK RIVER near Belvire	700	109		644	618	110		564
ROCK CREEK near Red Lodge	130	110	123	118	100	109	98.6	91.4
INFLOW COONEY RESERVOIR near Boyd (2)	57.0	88		64.5	46.0	88		52.5
YELLOWSTONE RIVER at Billings	4830	103	3998	4,682	4100	103	3628	3,979
BIGHORN RIVER near St. Xavier (3)	1830	90	1331	2,034	1675	90	1328	1,861
LITTLE BIGHORN RIVER near Hardin	157	80		196	140	80		174
YELLOWSTONE RIVER at Miles City (4)	6990	98		7,142	6120	98		6,243
YELLOWSTONE RIVER near Sidney (5)	7655	98		7,806	6670	98		6,805

- (1) Adjusted for storage in Myrtle Lake.
- (2) Adjusted for storage in Cooney Reservoir.
- (3) Adjusted for storage in Buffalo Bill, Boyesen, Bull Lake, Pilot Butte and Bighorn Reservoirs.
- (4) Adjusted for storage in Bull Lake, Buffalo Bill, Boyesen, Pilot Butte, Bighorn and Tongue River Reservoirs.
- (5) Adjusted for reservoirs shown in (4) and diversions into the Lower Yellowstone Canal.

ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE



Snow samples are made at marked locations called snow courses. The average of 10 samples, taken at specific points each time, are reported as the snow course measurement.

## Water supply

## outlook good

Storms in early April, along with snowpack measured on April 1 surveys, have virtually assured Yellowstone River water users an adequate supply this runoff season. Some minor shortages may be expected on smaller drainages in the Red Lodge Creek and the Little Bighorn River areas. However, if present storm patterns continue, even these areas may have near average snowpack before melt begins.

Almost all forecasts increased from 5 to 10 percent over those issued last month. In general, the headwaters are expected to produce a little more water than average this spring and summer while downstream tributaries are forecast to have a little below average runoff.

## WATER SUPPLY OUTLOOK

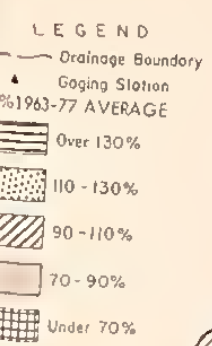
STREAM or AREA	Flow Prognosis	
	Spring Season	Late Season
Yellowstone at Livingston	Exc	Exc
Shields	Avg	Avg
Boulder	Avg	Avg
Sweetgrass - Big Timber	Avg	Avg
Stillwater	Avg	Avg
Rock Creek	Avg	Avg
Clark's Fork	Avg	Avg
Yellowstone above Bighorn	Avg	Avg
Bighorn	Avg	Avg
Little Bighorn	Fair	Fair
Tongue	Fair	Fair
Powder	Fair	Fair
Lower Yellowstone	Avg	Avg

## Snowpack above average on headwaters

March snowfall was above average in most drainages, with additional snowfall occurring in early April. Presently, the amount of water stored in the snowpack is above average in the Yellowstone River headwaters and near to a little below average in tributary streams.

The northern part of the Bighorn Mountains continues to show below average snowpack even though this area received good moisture during March.

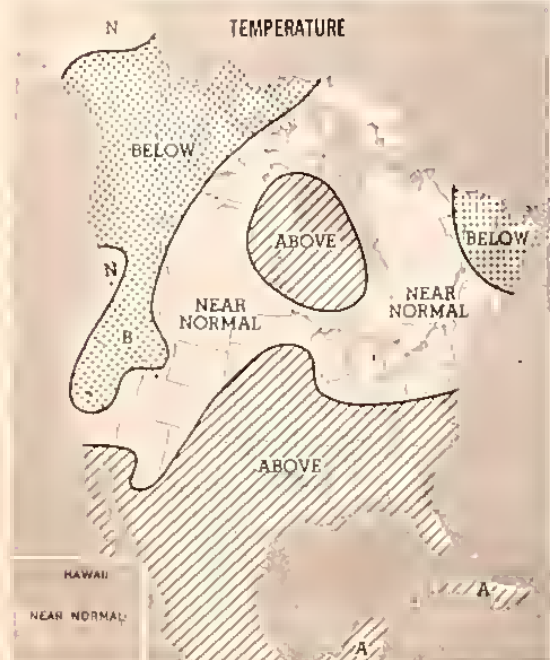
Valley soil moisture is good because of recent precipitation and snowmelt. Mountain soils under the snowpack have average to a little below average moisture levels.



YELLOWSTONE RIVER DRAINAGE MONTANA MOUNTAIN SNOW WATER EQUIVALENT

## average monthly weather outlook

FOR APRIL 1982



New powder snow and wind combine to create drifts and cornices.



# SNOW SURVEY DATA

SNOW April 1, 1982									
DRAINAGE BASIN and/or SNOW COURSE									
NAME	Elevation	Date at Survey	Snow Depth (Inches)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)
ABUNDANCE LAKE	8800	3/25	74	25.5	15.5	22.5			
AMBROSE	6480	3/26	54	17.0	6.7	14.4			
ARCH FALLS	7350	3/29	56	14.2	6.6	14.4			
ASHLEY DIVIDE	4820	3/31	28	8.2	1.5	-			
ASHLEY LAKE	4000	3/31	26	6.7	2.0	-			
BADGER PASS	6900	4/02	113	46.3A	26.1	41.7			
BALD EAGLE PEAK	5700	3/25	173	72.6	39.3	64.7			
BALD RIDGE	7500	3/26	44	13.3	10.3	14.6			
BANFIELD MOUNTAIN	5600	3/25	77	28.4	15.0	25.8			
BANFIELD MOUNTAIN PILLW	5600	3/25	SP	25.9	14.8	22.5			
BARRE CREEK	5500	3/31	121	49.5	28.0	50.3			
BARRE MIDWAY	4600	3/30	99	39.6	16.1	38.8			
BARRE TRAIL	3800	3/31	24	9.2	.5	9.8			
BARKER LAKES	8250	3/26	56	15.9	13.6	-			
BARKER LAKES PILLW	8250	4/01	SP	17.7	13.5	-			
BASIN CREEK	7180	3/29	47	11.8	9.3	8.4			
BASIN CREEK PILLW	7180	4/01	SP	11.0	9.0	-			
BASSOD PEAK	5150	4/01	30	10.2	3.1	11.5			
BEAGLE SPRINGS	8850	3/27	46	12.5	9.8	-			
BEAGLE SPRINGS PILLW	8850	4/01	SP	12.7	8.9	-			
BEAR BASIN	8150	3/31	76	25.4	16.2	23.3			
BEAR PAW SKI AREA	5200	3/30	27	8.4	2.1	7.3			
BEAVER LAKE	5900	4/02	79	30.2	12.8	25.8			
BERRY MEADOW	7300	3/29	39	10.6	5.8	8.4			
BIG CREEK	6750	4/01	EST	50.0	33.8	47.6			
BIG SKY	7700	4/01	69	21.2	11.0	17.3			
BIG SKY MEADOW	6350	3/31	43	12.6	5.9	10.0			
BIG SNOWY	7150	3/31	61	19.3	18.7	24.1			
BLACK BEAR	7950	3/30	147	57.4	27.2	44.1			
BLACK BEAR PILLW	7950	3/30	SP	48.5	27.0	40.0			
BLACK MOUNTAIN	7750	3/30	64	18.1	15.8	-			
BLACK PINE	7100	3/30	59	18.6	7.7	15.5			
BLACK PINE PILLW	7100	3/30	SP	18.9	11.6	16.0			
BLOODY DICK	7600	4/02	55	18.2	11.0	14.8			
BLOODY DICK PILLW	7600	4/02	SP	16.5	9.9	-			
BLUE LAKE	5900	4/02	84	33.6A	15.6	28.0			
BOIS SOIS	8000	3/29	25	6.8	3.6	9.1			
BOULDER MOUNTAIN	7950	3/25	67	21.3	16.7	20.7			
BOULDER MOUNTAIN PILLW	7950	4/01	SP	25.3	18.7	-			
BOX CANYON	6670	3/28	42	12.9	5.7	14.2			
BOX CANYON PILLW	6670	4/01	SP	12.7	4.2	-			
BRANHAM LAKES	8850	3/29	95	35.6	26.4	31.9			
BRIDGER BOWL	7250	4/01	78	28.2	19.7	30.2			
BRIDGER BOWL PILLW	7250	4/01	SP	26.2	22.8	29.5			
BRISTOW CREEK	3900	3/25	32	13.0	.2	12.6			
BRUSH CREEK LIMBER	5000	3/29	34	11.0	3.9	10.6			
BULL MOUNTAIN	6600	3/26	32	8.6	2.2	6.7			
CABIN CREEK	5200	3/29	26	7.4	.0	7.2			
CALL ROAD	8050	3/27	48	13.1	9.0	13.1			
CALVERT CREEK	6450	4/01	51	15.4	7.0	13.2			
CALVERT CREEK PILLW	6450	4/01	SP	12.4	4.5	9.8			
CAMP MISERY	6400	3/26	124	50.3	48.2	52.0			
CAMP SENIA	7890	3/29	20	3.2	3.1	7.7			
CARROT BASIN	9000	4/05	141	50.6	23.5	39.5			
CARROT BASIN PILLW	9000	4/05	SP	35.2	21.0	29.8			

SNOW April 1, 1982									
DRAINAGE BASIN and/or SNOW COURSE									
NAME	Elevation	Date at Survey	Snow Depth (Inches)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)
CARTER CREEK	7400	3/26	27	6.9	4.0	6.6			
CASHE CREEK PILLW	7800	4/01	SP	13.2	6.5	-			
CEDAR GROVE	4100	3/25	35	12.8	2.3	14.2			
CHESSMAN RESERVOIR	6200	3/31	20	4.9	4.2	4.2			
CHICKEN CREEK	4060	3/30	40	15.8	6.8	-			
CLOVER MEADOW	8600	3/27	65	19.0	14.6	19.7			
CLOVER MEADOW PILLW	8600	4/01	SP	21.7	14.6	-			
COLE CREEK	7850	3/25	70	16.0	14.0	19.6			
COLE CREEK PILLW	7850	3/25	SP	14.8	12.8	19.4			
COLLEY CREEK	6300	3/26	38	10.6	4.4	9.8			
COMBINATION	5600	3/30	30	8.8	2.4	6.5			
COMBINATION PILLW	5600	3/30	SP	9.3	3.2	6.6			
COOKE STATION	8150	3/29	76	23.6	13.0	21.3			
COPPER BOTTOM	5200	4/01	EST	14.0	1.2	11.9			
COPPER BOTTOM PILLW	5200	4/01	SP	16.0	7.4	14.8			
COPPER CAMP	6950	4/01	EST	40.0	19.6	34.2			
COPPER CAMP PILLW	6950	4/01	SP	43.1	24.0	42.8			
COPPER CREEK	5700	4/01	EST	20.0	4.4	16.1			
COPPER LAKE CREEK	6100	4/01	EST	32.0	12.3	26.3			
COPPER MOUNTAIN	7700	3/31	54	16.4	10.4	12.2			
COTTONWOOD CREEK	6400	3/29	40	10.3	7.9	9.0			
COYOTE HILL	4200	3/26	31	11.8	3.1	10.7			
CREVICE MOUNTAIN	8400	3/31	57	14.9	4.7	11.5			
CRYSTAL LAKE	6100	3/31	42	13.6	12.2	15.7			
CRYSTAL LAKE PILLW	6100	4/01	SP	12.3	11.6	-			
DAD CREEK LAKE	8400	3/27	EST	17.5	12.0	15.8			
DAISY PEAK	7600	3/25	50	14.2	6.8	12.0			
DALY CREEK	5780	3/28	52	16.4	7.0	13.1			
DALY CREEK PILLW	5780	4/01	SP	18.3	8.5	-			
DARKHORSE LAKE	8600	3/28	81	31.6	20.0	30.1			
DARKHORSE LAKE PILLW	8600	4/01	SP	30.2	18.1	-			
DAVIS CREEK	5400	3/25	77	30.2	19.2	27.1			
DEADMAN CREEK	6450	3/31	39	11.8	8.0	12.6			
DEADMAN CREEK PILLW	6450	3/31	SP	11.5	5.6	11.1			
DEVILS MOUNTAIN	5600	3/25	51	17.4	12.2	17.3			
DEVILS SLIDE	8100	3/29	87	25.3	13.6	24.6			
DISCOVERY BASIN	7050	3/30	48	13.8	9.4	11.9			
DIVIDE	7900	3/26	54	14.2	7.4	12.2			
DIVIDE PILLW	7900	3/26	SP	14.4	8.2	12.8			
DIK HILL	6400	3/31	43	14.2	7.4	10.4			
EAGLE CREEK	7000	3/27	47	15.6	8.8	16.1			
EAST BOULDER S	9250	4/05	EST	33.5A	19.0	33.6			
EL DORADO MINE	7800	3/25	24	8.6	0.0	6.7			
ELK HORN SPRINGS	7800	3/29	82	26.0	18.4	23.8			
ELK PEAK	8000	3/30	62	18.4	15.8	18.7			
EMERY CREEK	4350	3/25	47	7.7	11.2	17.1			
EMERY CREEK PILLW	4350	3/25	SP	18.1	12.0	-			
FATY CREEK	5500	4/01	EST	28.0	16.3	25.1			
FISH CREEK	8000	3/29	54	14.4	9.8	9.8			
FISHER CREEK	9100	3/29	126	44.8	24.4	41.3			
FISHER CREEK PILLW	9100	3/29	SP	40.2	23.8	38.7			
FLUTE-BULL	5700	4/02	31	9.9	.6	7.6			
FLATTOP MOUNTAIN PILLW	6300	4/01	SP	52.4	43.8	51.6			
FLEECER RIDGE	7500	3/26	51	14.6	8.0	12.2			

SNOW April 1, 1982									
DRAINAGE BASIN and/or SNOW COURSE									
NAME	Elevation	Date at Survey	Snow Depth (Inches)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)	Water Content (Percent)
FODLHEN	8280	3/25	62	20.6	13.2	19.1			
FOREST LAKE	6400	3/27	40	11.9	7.8	12.3			
FOUR MILE	6900	3/25	33	9.8	6.4	9.3			
FOURTH OF JULY	3450	3/29	30	7.3	.0	-			
FRED BURR PASS	8000	4/02	91	33.0	19.0	27.7			
FREIGHT CREEK	6000	4/02	57	21.5	7.4	17.2			
FRIDAY HILL	4620	3/29	64	24.6	11.4	-			
FRONNER MEADOWS	6480	3/31	35	11.2	4.8	9.2			
FRONNER MEADOWS PILLW	6480	3/31	SP	10.8	8.8	10.0			
GARVER CREEK	4250	3/25	33	12.4	6.1	12.0			
GARVER CREEK PILLW	4250	3/25	SP	11.1	6.4	10.8			
GIBBONS PASS	7100	3/25	84	30.9	17.8	24.8			
GOAT MOUNTAIN	7000	3/29	45	13.7	3.4	11.6			
GOLD CREEK LAKE	7200	3/29	65	19.4	12.4	17.7			
GOLD STONE	8100	4/02	68	22.8	15.0	18.9			
GRASSHOPPER	7000	3/30	25	6.7	4.2	6.4			
GRAVE CREEK	4300	3/25	50	18.6	9.7	19.2			
GRAVE CREEK PILLW	4300	3/25	SP	18.5	8.1	18.7			
GRIFFIN CREEK DIVIDE	5150	4/01	42	14.0	6.7	12.2			
GRIZZLY PEAK	8640	3/25	64	14.1	11.5	17.9			
GUNSIGHT LAKE	6300	4/02	113	47.9	24.6	42.7			
HAND CREEK	5030	3/29	47	15.6	9.4	14.1			
HAND CREEK PILLW	5030	4/01	SP	18.8	10.6	-			
HAWKINS LAKE	6450	3/25	91	36.0	25.1	34.2			
HAWKINS LAKE PILLW	6450	3/25	SP	31.7	22.3	31.6			
HAYMAKER	8050	3/26	54	14.4	9.4	13.8			
HEART LAKE TRAIL	4800	3/29	59	24.2	8.2	23.8			
HEBGEN DAM	6550	4/01	62	16.4	7.7	12.5			
HELL ROARING DIVIDE	5770	4/01	93	34.2	22.2	34.4			
HERRIG JUNCTION	4850	3/30	80	33.2	18.3	-			
HOLBROOK	4530	3/27	32	11.3A	2.6	10.7			
HOOD MEADOW	6600	3/30	44	12.4	5.4	12.4			
HOODOO BASIN	6000	3/29	148	65.0	34.4	53.6			</









# Columbia River Drainage

## STREAMFLOW FORECASTS

DRAINAGE AREA AND FORECAST POINT	THIS YEAR				PAST RECORD				THIS YEAR				PAST RECORD			
	FORECAST		PAST RECORD		FORECAST		PAST RECORD		FORECAST		PAST RECORD		FORECAST		PAST RECORD	
	THOUSAND CFS	PERCENT OF AVERAGE	THOUSAND CFS	PERCENT OF AVERAGE	THOUSAND CFS	PERCENT OF AVERAGE	THOUSAND CFS	PERCENT OF AVERAGE	THOUSAND CFS	PERCENT OF AVERAGE	THOUSAND CFS	PERCENT OF AVERAGE	THOUSAND CFS	PERCENT OF AVERAGE	THOUSAND CFS	PERCENT OF AVERAGE
APRIL - SEPTEMBER																
APRIL - JULY																
APRIL - JUNE																
KOOTENAI RIVER below Libby Dam (1)	7,830	108	6,726	7,246	6,680	108	5,516	6,178								
FISHER RIVER near Libby	260	96		240	243	96		253								
YAK RIVER near Troy	534	99		537	510	99		514								
KOOTENAI RIVER at Leona (1)	9,380	106	7,941	8,883	8,160	106	6,601	7,727	6,520	106	4,573	6,150				
INFLOW MOUTON RESERVOIR nr BUTTE (Million Gallons)					365	128		286	335	129	352	260				
WARM SPRINGS CREEK AT HEYERS DAM near Anaconda (2)	56.0	110		50.7	45.5	110		41.2								
FLINT CREEK near Southern Cross (3)	21.0	114	23.8	18.5	17.5	114	20.3	15.4								
FLINT CREEK below Boulder Creek (4)	85.5	110		77.6	68.0	111		61.3								
INFLOW LOWER WILLOW CREEK RESERVOIR near Hall (5)	21.0	124		16.9	20.0	125		16.0								
MIDDLE FORK ROCK CREEK near Philipsburg	96.0	122		78.8	86.5	122		71.1								
NEVADA CREEK near Finn	28.5	121		23.6	26.5	122		21.8								
BLACKFOOT RIVER near Bonner	1,145	113		1,017	1,040	113		920	900	113		794				
CLARK FORK RIVER above Milltown (6)	960	114		843	838	115		730	705	115		613				
CLARK FORK RIVER above Missoula	2,105	113	1,530	1,859	1,878	114	1,359	1,651	1,605	114	1,148	1,408				
WEST FORK BITTERROOT RIVER near Conner (7)	242	129		187	223	130		172								
BITTERROOT RIVER near Darby	775	129	445	602	710	129	401	552	625	130	339	480				
SKALKAHOO CREEK near Hamilton	68.0	118		57.4	59.5	119		49.8								
BURNT FORK CREEK near Stevensville (8)	44.2	114		38.8	38.8	115		33.6								
BITTERROOT RIVER at Missoula (9)	1,880	122		1,543	1,745	123		1,416	1,495	123		1,211				
CLARK FORK RIVER below Missoula	3,895	117		3,405	3,623	118		3,069	3,100	118		2,618				
CLARK FORK RIVER at St. Regis	5,180	115	3,586	4,521	4,670	115	3,240	4,078	4,010	115	2,797	3,492				
NORTH FORK FLATHEAD RIVER near Columbia Falls	1,970	100		1,969	1,785	100		1,782	1,500	100		1,498				
MIDDLE FORK FLATHEAD RIVER near West Glacier	2,100	110	1,504	1,911	1,920	110	1,385	1,750	1,620	110	1,134	1,470				
SOUTH FORK FLATHEAD RIVER near Columbia Falls (10)	2,500	109	1,815	2,302	2,350	109	1,714	2,159	2,050	109	1,475	1,884				
FLATHEAD RIVER at Columbia Falls (10)	6,760	107	5,061	6,330	6,220	107	4,664	5,827	5,300	107	3,860	4,964				
SWAN RIVER near Big Fork	740	109		681	650	109		596								
FLATHEAD RIVER near Polson (11)	8,050	109	6,097	7,394	7,400	109	5,622	6,806	6,300	109	4,600	5,779				
CLARK FORK RIVER near Plains (11)	14,000	113	10,071	12,340	12,700	113	9,190	11,222	10,750	113	7,570	9,507				
THOMPSON RIVER near Thompson Falls	275	105		263	247	106		234								
PROSPECT CREEK at Thompson Falls	153	107		143	143	108		133								
CLARK FORK RIVER at Whitehorse Rapids (12)	15,800	115		13,781	14,400	115		12,519	12,200	115		10,633				

- (1) Adjusted for storage in Lake Kootenai.
- (2) Adjusted for storage in Silver Lake, diversions to and pumping from Georgetown Lake.
- (3) Adjusted for storage in Georgetown Lake, diversions from and pumping to Silver Lake.
- (4) Sun Flint Creek at Maxville and Boulder Creek at Maxville.
- (5) Sun of North Park Lower Willow Creek near Hall and South Fork Lower Willow Creek near Hall.
- (6) Difference in observed flow Clark Fork above Missoula and Blackfoot near Bonner.
- (7) Adjusted for storage in Painted Rocks Reservoir.
- (8) Adjusted for diversion into Sunset Highway Canal.
- (9) Difference in observed flow Clark Fork above and below Missoula.
- (10) Adjusted for storage in Hungry Horse Reservoir.
- (11) Adjusted for storage in Hungry Horse Reservoir and Flathead Lake.
- (12) Adjusted for storage in Hungry Horse Reservoir, Flathead Lake and Nason Rapids Reservoir.

ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE



Streamflows should be adequate

Good March and early April snowfall has improved water supplies particularly in the Upper Clark Fork and Blackfoot River drainages. Generally, the higher percentage or above average forecasts are in the southern drainages and the lower percentage or near average forecasts are in the northern portion of the drainage. Adequate irrigation water supplies are anticipated for all drainages. Good high elevation snowpack should hold streamflows up well into the summer.

## WATER SUPPLY OUTLOOK

Expressed as "Poor, Fair, Average, Excellent" with respect to Water Supply

STREAM or AREA	Flow Period	
	Spring	Summer
Tobacco	Avg	Avg
Little Bitterroot	Exc	Avg
Mission Valley	Exc	Avg
Flint Creek	Exc	Exc
Upper Clark Fork	Exc	Exc
Nevada Creek	Exc	Avg
Blackfoot	Exc	Exc
West-side Bitterroot	Exc	Exc
East-side Bitterroot	Exc	Exc
Bitterroot River	Exc	Exc
Lower Clark Fork	Exc	Exc



Tucker snow-cats are used by Montana snow surveyors to travel over the loose, powder snow common in the higher elevation drainages.

## SUMMARY of SNOW MEASUREMENTS

(COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN	Number of Gauging Stations	THIS YEAR'S SNOW WATER EQUIVALENT	1963-77 AVERAGE
East Kootenai/BC	24	140	110
Kootenai/Montana	27	182	108
Kootenai above Bonners Ferry...	51	165	109
Little Bitterroot	5	227	106
N. Fk. Flathead...	10	148	101
M. Fk. Flathead...	9	175	111
S. Fk. Flathead...	11	142	102
Swan	7	126	101
Flathead	42	148	104
Stillwater & Whitefish...	5	184	106
Clark Fork above Blackfoot	37	165	118
Blackfoot	20	214	116
Upper Clark Fork above Missoula	57	182	117
Bitterroot	15	225	122
Lower Clark Fork below Missoula	14	201	108
Clark Fork (Total w/o Flathead)...	86	196	116
Pend O'Reille (Clark Fork & Flathead)...	128	173	111
Columbia (Pend O'Reille & Kootenai)...	137	182	113



COLUMBIA RIVER DRAINAGE MONTANA MOUNTAIN SNOW WATER EQUIVALENT

Above average snowpack in high and low elevations

March snowfall was above average in most drainages. Low elevation snow courses have well above average snowpack due to good snowfall and less than normal melt at these elevations. The Continental Divide from Butte to Glacier Park received large increases in water content during March.

Presently, all drainages have near or above average amounts of water stored in the mountain snowpack.

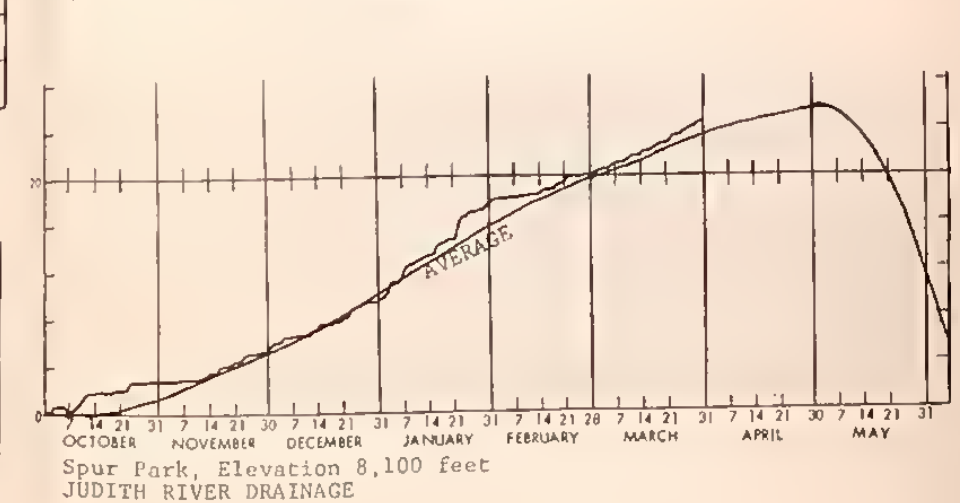
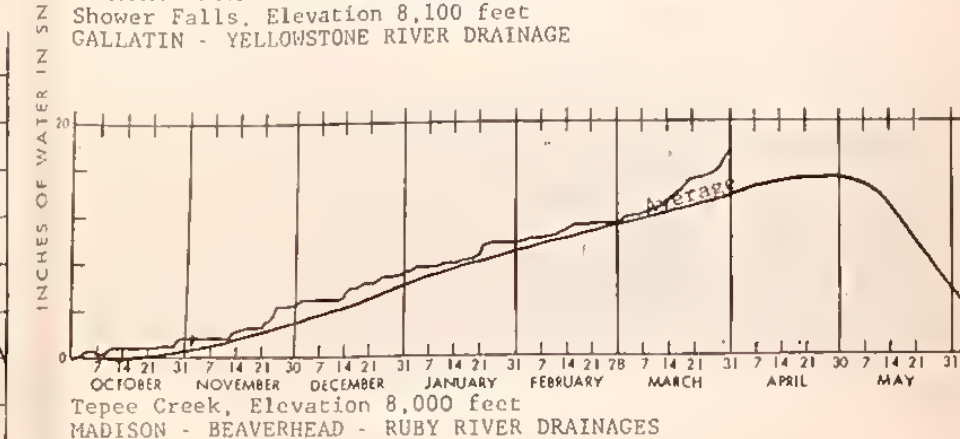
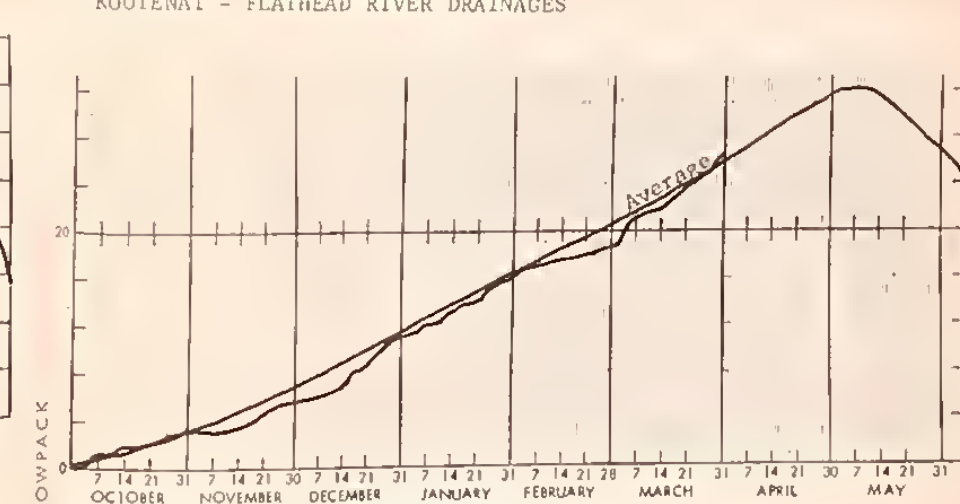
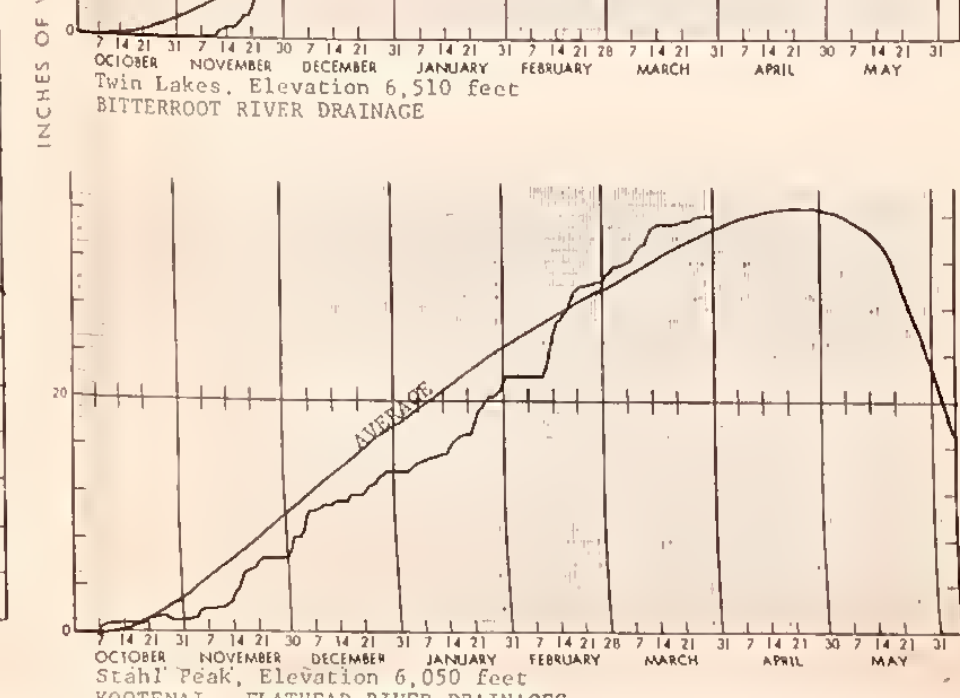
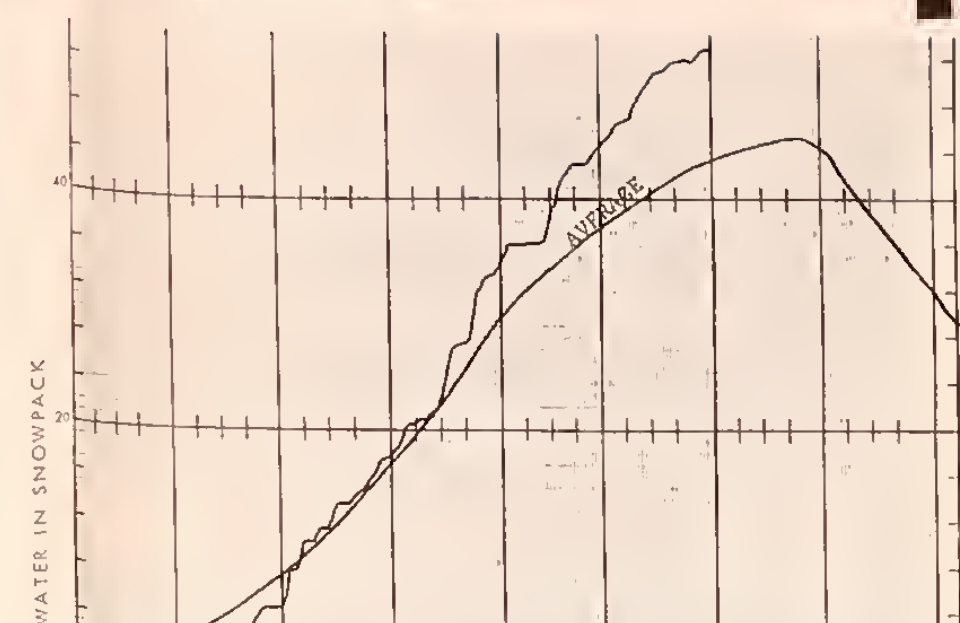
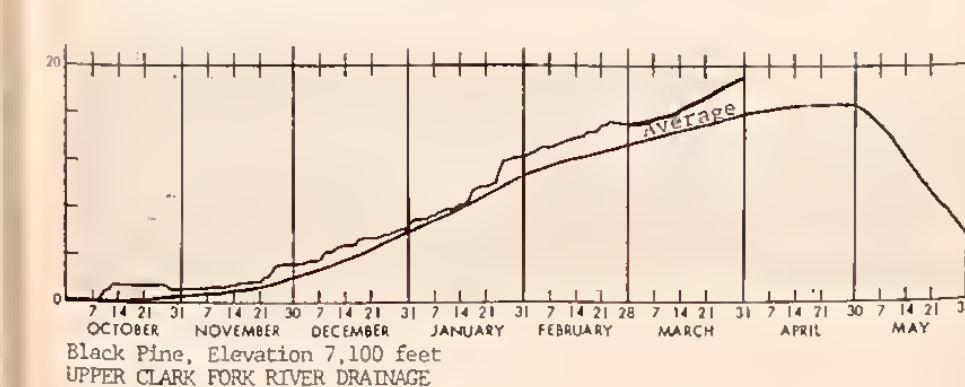
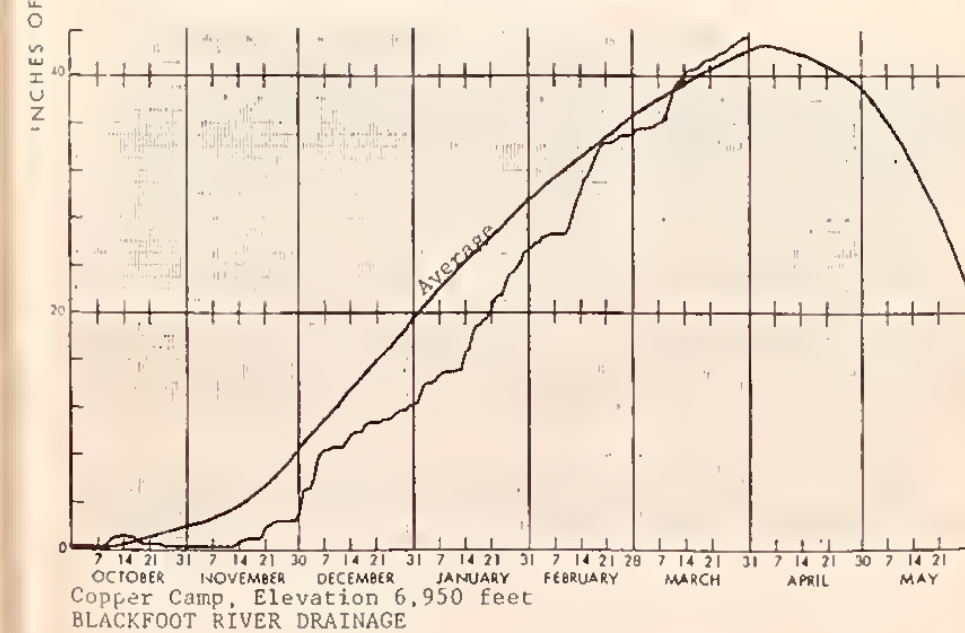
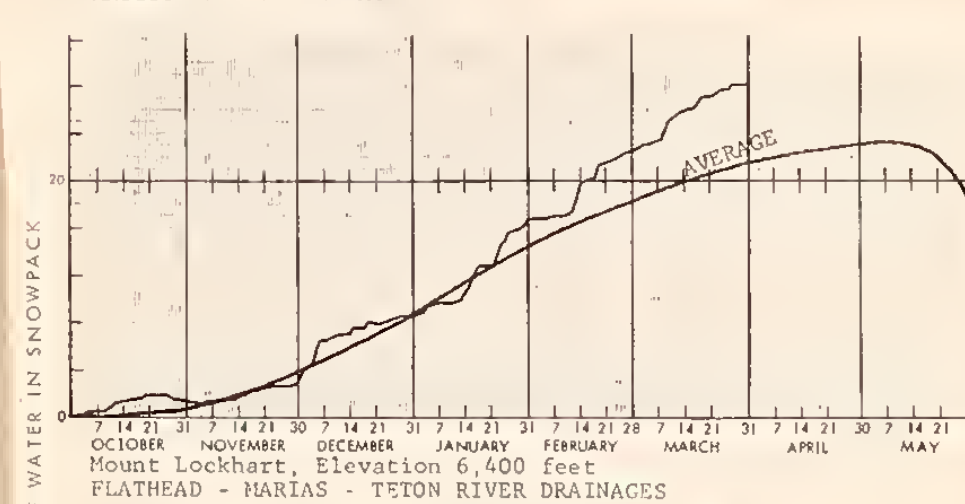
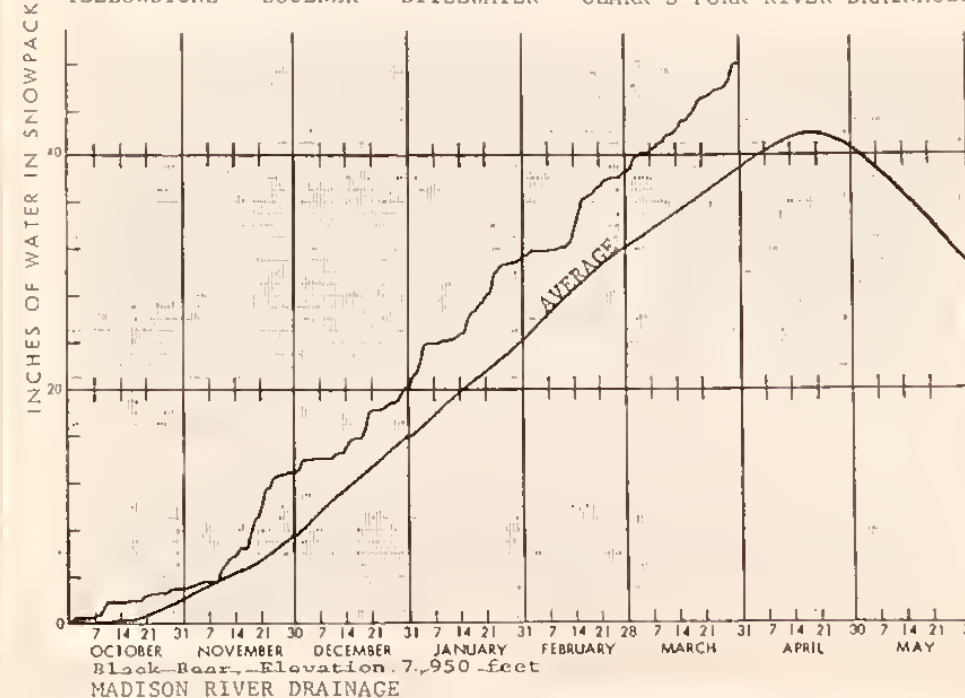
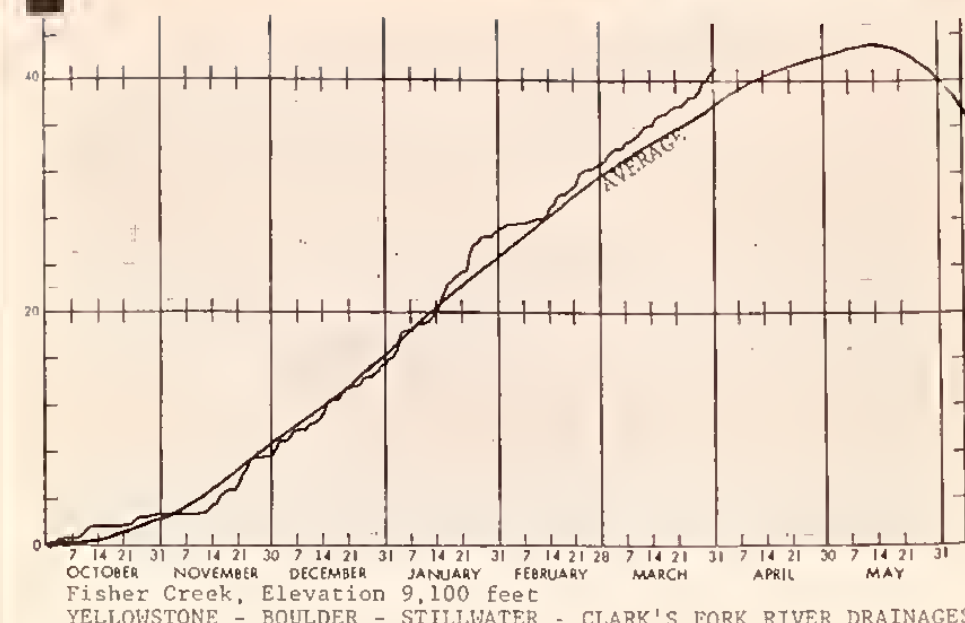
The Bitterroot and Upper Clark Fork continue to show well above average snow cover.

Mountain soils under the snowpack have near to below average moisture.

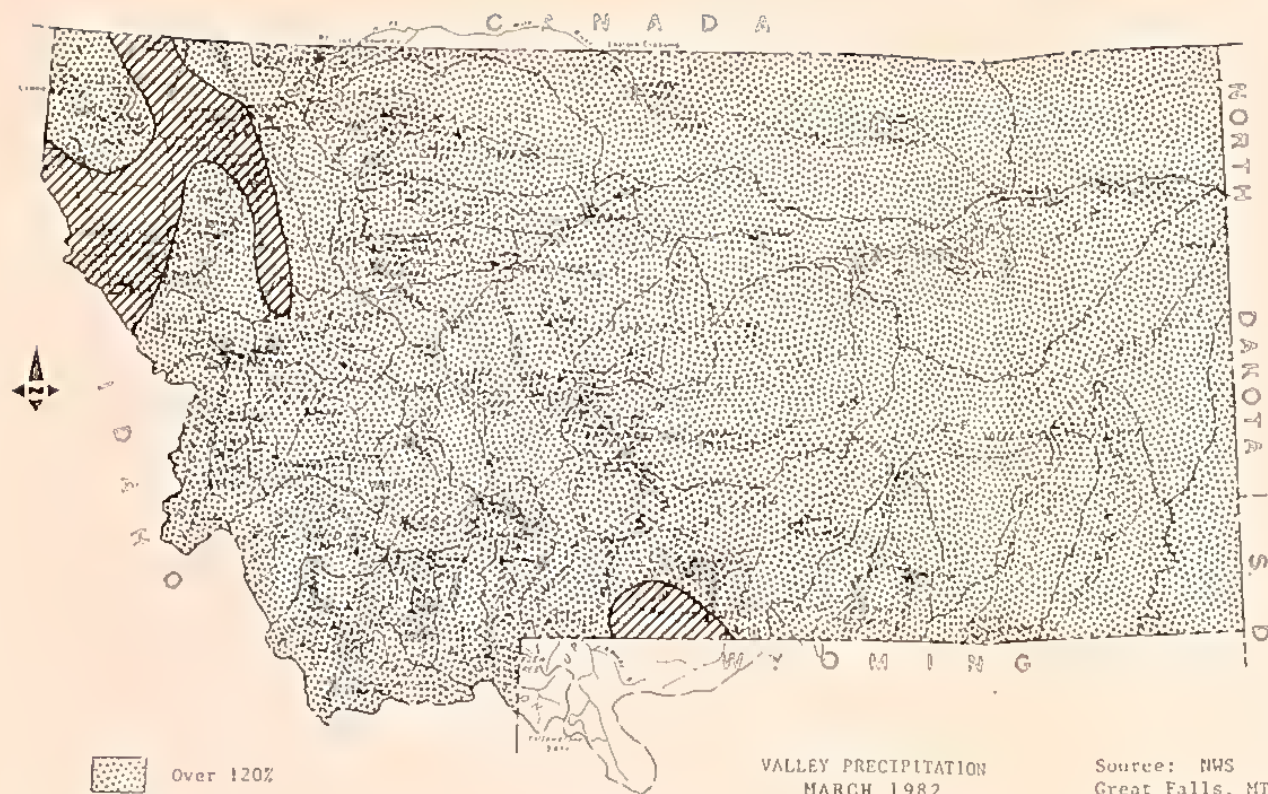


Big game animals must forage through the snowpack that has accumulated on their winter range.

# SNOW PILLOW DATA







VALLEY PRECIPITATION  
MARCH 1982

Source: NWS  
Great Falls, MT



RESERVOIR STORAGE (Thousand Acre Feet) END OF MONTH March 31, 1982 Average based on 1963-77 period.

Basin or Stream	RESERVOIR	Usable Capacity	Usable Storage		
			This Year	Last Year	Average
COLUMBIA					
Kootenai	Kootenai	5,748.2	1,904.0	2,014.0	---
Flathead	Hungry Horse	3,451.0	2,158.0	2,646.0	2,016.0
	Flathead Lake	1,791.0	750.4	745.6	775.7
	Camas (4)	45.2	27.0	28.0	23.8
	Mission Valley (8)	100.3	24.4	44.2	41.1
Clark Fork	Georgetown Lake	31.0	28.5	28.0	24.0
	Lower Willow Creek	4.9	---	2.7	1.9
	Nevada Creek	12.6	8.9	9.0	7.9
	Noxon Rapids	334.6	312.1	158.7	191.9
Bitterroot	Painted Rocks	31.7	---	---	17.6
	Como	34.9	---	---	15.6
MISSOURI					
Beaverhead	Lima	84.0	29.0	55.2	42.6
	Clark Canyon	257.2	167.3	170.8	143.7
Ruby	Ruby	38.8	---	36.5	30.9
Madison	Hebgen Lake	377.5	260.8	277.2	245.5
	Ennis Lake	41.0	30.1	31.6	34.4
Gallatin	Middle Creek	8.0	3.8	4.4	4.0
Missouri	Canyon Ferry	2,043.0	1,436.0	1,569.0	1,527.0
	Hauser & Helena	61.9	63.0	63.0	59.8
	Lake Helena	10.4	10.9	10.9	9.8
	Holter Lake	81.9	77.2	15.1	66.2
	Fort Peck Lake	18,910.0	14,200.0	14,820.0	15,480.0
Smith	Smith River	10.6	8.1	6.8	7.7
	Newlan Creek	12.4	10.2	10.0	---
Musselshell	Bair	7.0	4.6	5.1	5.4
	Martinsdale	23.1	11.8	10.9	10.1
	Deadman's Basin	72.2	---	61.4	52.6
Sun	Gibson	99.1	56.2	61.9	47.0
	Willow Creek	32.2	24.7	20.5	22.8
	Pishkun	32.0	19.8	26.4	16.5
Marias	Lower Two Medicine	11.9	---	12.0	6.9
	Four Horns	19.2	---	11.2	12.3
	Swift	30.0	12.0	22.9	16.9
	Lake Frances	111.9	78.4	79.9	71.9
Milk	Elwell (Tiber)	1,347.0	535.2	510.9	551.9
	Beaver Creek	3.5	2.5	1.8	1.9
	Fresno	127.2	54.9	59.9	89.1
	Nelson	66.8	35.6	24.5	41.5
HUDSON BAY					
St. Mary's	Lake Sherburne	64.3	20.8	17.2	25.1
YELLOWSTONE					
Stillwater	Mystic Lake	21.0	0.6	---	4.3
Clark's Fork	Cooney	27.4	3.1	---	16.4
Tongue	Tongue River	68.0	18.4	17.1	44.0
Bighorn	Bighorn Lake	1,356.0	836.0	847.4	552.1

## SATELLITE SNOW COVER

### MISSOURI RIVER BASIN Above Canyon Ferry Dam



DATA PROVIDED BY NOAA/NESS

□ Snow Covered Area

Scale 1:2,500,000

DATE	PERCENT SNOW COVER	AVERAGE SNOWLINE ELEVATION IN FEET
November 8, 1981	9.5	8535
November 19, 1981	53	6530
November 26, 1981	100	3800
November 29, 1981	100	3800
December 7, 1981	71	5770
December 17, 1981	100	3800
December 20, 1981	91	4680
December 29, 1981	95	4380
January 6, 1982	96	4300
January 10, 1982	91	4680
January 17, 1982	100	3800
February 3, 1982	100	3800
February 18, 1982	76	5540
February 24, 1982	88	4890
February 28, 1982	76	5540
March 5, 1982	95	4380
March 13, 1982	59	6290
March 21, 1982	100	3800
March 25, 1982	91	4680

## AGENCIES AND ORGANIZATIONS COOPERATING IN MONTANA SNOW SURVEYS

### GOVERNMENT AGENCIES

#### Canada

Department of the Environment  
Atmospheric Environment Service  
Water Management Service  
British Columbia Ministry of Environment  
Inventory and Engineering Branch, Hydrology Section  
Alberta Environment  
Technical Services Division

#### Federal

Department of the Army - Corps of Engineers  
Department of Agriculture - Forest Service  
- Soil Conservation Service  
Department of Commerce - National Environmental Satellite Service  
- National Weather Service  
Department of Interior - Bureau of Indian Affairs  
- Fish and Wildlife Service  
- Geological Survey  
- National Park Service  
- Bureau of Reclamation  
Department of Energy - Bonneville Power Administration

### STATE AGENCIES

Montana Conservation Districts  
Montana Department of Fish, Wildlife and Parks  
Montana Department of Natural Resources and Conservation  
Montana State University - Agricultural Experiment Station  
University of Montana - School of Forestry

### PRIVATE ORGANIZATIONS

The Anaconda Company  
Big Sky of Montana  
Butte Water Company  
Flathead Valley Community College  
Montana Power Company

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.